What is claimed is:

1. A method of measuring a three-dimensional distribution of an electric field in a direction of separation from an object to be measured, comprising the steps of:

making a first measurement using a plurality of electric field sensors for electro-optic sampling, each of sensors comprising an electro-optic crystal layer, a light -reflection layer that is in close contact with the electro-optic crystal layer and a separation layer that is formed of a material identical to that of the electro-optic crystal layer and is in close contact with the reflection layer to separate the reflection layer from the object to be measured, in which electric field strength at a predetermined point is measured using a first electric field sensor having a first electro-optic crystal layer and a first separation layer; and

making a second measurement in which electric field strength at the predetermined point is measured using a second field sensor having a second electro-optic crystal layer and a second separation layer, wherein the second measurement is made satisfying conditions that the first electro-optic crystal layer and the second electro-optic crystal layer are formed of a same material, that a sum thickness of the first electro-optic crystal layer and the first separation layer equals a sum thickness of the second electro-optic crystal layer and the second separation layer, and that the first separation layer and second separation layer have different thicknesses.

2. An apparatus for measuring a three-dimensional distribution and an intensity of an electric field, comprising:

an electric field sensor array comprising a plurality of electric field sensors for electro-optic sampling;

a light source that irradiates the electric field sensor array with a probe light; and

a detector that measures the light reflected as polarized light; and

means that uses intensity of the polarized light to measure strength of the electric field;

each of the sensors comprising an electro-optic crystal layer, a separation layer that separates the electro-optic crystal layer from an object to be measured and is constituted of a same material as the electro-optic crystal layer, and a light reflection layer, in which a sum thickness of the separation layer and electro-optic crystal layer of each sensor is a constant.

3. The apparatus according to claim 2, in which the separation layer has a plane surface in contact with the object to be measured.

4. The apparatus according to claim 2, further comprising a microscope through which light that irradiates the electric field sensor array is passed and means that can observe a degree of polarization of the light reflected via the microscope.

5. The apparatus according to claim 2, further comprising a two-dimensional imaging apparatus that includes a polarized light detector that captures light reflected from the reflection layer of each of the sensors of the electric field sensor array simultaneously irradiated by the probe light, and image-processing means that processes the separation layer thickness as a distance from the object to be measured to form a three-dimensional image.

6. The apparatus according to claim 2, in which the electric field sensor array comprises a row of one-dimensional sub-arrays of a plurality of electric field sensors for electro-optic sampling, each of the sensors being constituted of an electro-optic crystal layer, a separation layer that separates the electro-optic crystal layer from

an object to be measured, and a light reflection layer, wherein a three-dimensional image of an electric field strength distribution is formed by sweeping the object to be measured in a direction that is orthogonal to an array direction of the sensors.

7. The apparatus according to claim 3, in which the electric field sensor array comprises a row of one-dimensional sub-arrays of a plurality of electric field sensors for electro-optic sampling, each of the sensors being constituted of an electro-optic crystal layer, a separation layer that separates the electro-optic crystal layer from an object to be measured, and a light reflection layer, wherein a three-dimensional image of an electric field strength distribution is formed by sweeping the object to be measured in a direction that is orthogonal to an array direction of the sensors.

8. The apparatus according to claim 4, in which the electric field sensor array comprises a row of one-dimensional sub-arrays of a plurality of electric field sensors for electro-optic sampling, each of the sensors being constituted of an electro-optic crystal layer, a separation layer that separates the electro-optic crystal layer from an object to be measured, and a light reflection layer, wherein a three-dimensional image of an electric field strength distribution is formed by sweeping the object to be measured in a direction that is orthogonal to an array direction of the sensors.

9. The apparatus according to claim 5, in which the electric field sensor array comprises a row of one-dimensional sub-arrays of a plurality of electric field sensors for electro-optic sampling, each of the sensors being constituted of an electro-optic crystal layer, a separation layer that separates the electro-optic crystal layer from an object to be measured, and a light reflection layer,

wherein a three-dimensional image of an electric field strength distribution is formed by sweeping the object to be measured in a direction that is orthogonal to an array direction of the sensors.

10. The apparatus according to claim 5, in which the electric field sensor array comprises a row of columns of two-dimensional sub-arrays of a plurality of electric field sensors for electro-optic sampling, each of the sensors being constituted of an electro-optic crystal layer, a separation layer that separates the electro-optic crystal layer from an object to be measured, and a light reflection layer.